

2 small weights of  $M_1=5\text{-Kg}$ . and  $M_2=7\text{-Kg}$ . are mounted 4cm apart on a light rod as shown. The moment of inertia of the system

a. if rotated about the axis half between weights.

b. if rotated about the axis 0.50cm left of 7-Kg.mass

\*There are 3 equations for the rod figure on our workbook. I don't know what to use.\*

1.  $I_{\text{center}} = mL^2/12$

2.  $I_{\text{end}} = mL^2/3$

3.  $I = mR^2$

Please explain and show your work

You shouldn't use equations for the rod ("on a **light** rod"). There are two point masses in your situation. So, the total moment of inertia will consist of two moments of inertia of the point mass:

$$I = I_1 + I_2 = M_1r_1^2 + M_2r_2^2$$

a.  $r_1 = r_2 = r = 0.02m$

$$I = (M_1 + M_2)r^2$$

$$I = (5kg + 7kg)(0.02m)^2 = 4.8 * 10^{-3}kg * m^2$$

b.  $r_1 = 0.035m, r_2 = 0.005m$

$$I = 5kg * (0.035m)^2 + 7kg * (0.005m)^2 = 6.3 * 10^{-3}kg * m^2$$

**Answer: a.**  $I = 4.8 * 10^{-3}kg * m^2$ , **b.**  $I = 6.3 * 10^{-3}kg * m^2$